

ABSTRACT OF THE DISCLSOSURE

Methods for separating di-olefins from mono-olefins, and olefins from non-olefins such as paraffins, oxygenates and aromatics; are provided. The methods use metal salts which complex both mono-olefins and di-olefins, but which selectively complex di-olefins in the presence of mono-olefins. The metal salts are dissolved or suspended in ionic liquids, which tend to have virtually no vapor pressure. Preferred salts are Group IB salts, more preferably silver and copper salts. A preferred silver salt is silver tetrafluoroborate. A preferred copper salt is silver CuOTf. Preferred ionic liquids are those which form stable solutions, suspensions or dispersions of the metal salts, which do not dissolve unwanted non-olefins, and which do not isomerize the mono- or di-olefins. The equivalents of the metal salt can be adjusted so that di-olefins are selectively adsorbed from mixtures of mono- and di-olefins. Alternatively, both mono- and di-olefins can be adsorbed, and the mono-olefins selectively desorbed. The latter approach can be preferred when non-olefins are also to be separated. The mono- and di-olefin-containing mixture can be in the gas phase or in the liquid phase. The flow of mono- and di-olefin-containing mixture over/through the ionic liquid can be, for example, co-current, counter-current, or staged in stirred tanks, with countercurrent being preferred.